

09/02/98



Jc551 U.S. PTO

PATENT APPLICATION TRANSMITTAL LETTER
(Small Entity)

Docket No.
97-106 CIP

A

TO THE ASSISTANT COMMISSIONER FOR PATENTS

Transmitted herewith for filing under 35 U.S.C. 111 and 37 C.F.R. 1.53 is the patent application of:

LONG, Charles J., Jr.

For: **SNAP-ON SCREW-OFF CLOSURE**

Jc551 U.S. PTO

09/145690



09/02/98

Enclosed are:

- ☒ Certificate of Mailing with Express Mail Mailing Label No. **EI133387660US**
- ☒ Five (5) sheets of drawings.
- ☐ A certified copy of a _____ application.
- ☒ Declaration ☒ Signed. ☐ Unsigned.
- ☒ Power of Attorney
- ☐ Information Disclosure Statement
- ☐ Preliminary Amendment
- ☒ One (1) Verified Statement(s) to Establish Small Entity Status Under 37 C.F.R. 1.9 and 1.27.
- ☐ Other:

CLAIMS AS FILED

For	#Filed	#Allowed	#Extra	Rate	Fee
Total Claims	24	- 20 =	4	x \$11.00	\$44.00
Indep. Claims	1	- 3 =	0	x \$41.00	\$0.00
Multiple Dependent Claims (check if applicable) <input type="checkbox"/>					\$0.00
BASIC FEE					\$395.00
TOTAL FILING FEE					\$439.00

- ☒ A check in the amount of **\$439.00** to cover the filing fee is enclosed.
- ☒ The Commissioner is hereby authorized to charge and credit Deposit Account No. **03-2026** as described below. A duplicate copy of this sheet is enclosed.
- ☐ Charge the amount of _____ as filing fee.
- ☐ Credit any overpayment.
- ☒ Charge any additional filing fees required under 37 C.F.R. 1.16 and 1.17.
- ☐ Charge the issue fee set in 37 C.F.R. 1.18 at the mailing of the Notice of Allowance, pursuant to 37 C.F.R. 1.311(b).

Dated: **September 2, 1998**

Signature

Thomas C. Wettach, Esquire
Registration No. 24,455
Ttius & McConomy LLP
Twentieth Floor
Four Gateway Center
Pittsburgh, PA 15222
(412) 642-2000
Attorney for Applicant

cc:

CERTIFICATE OF MAILING BY "EXPRESS MAIL" (37 CFR 1.10)Applicant(s): **LONG, Charles J., Jr.**

Docket No.

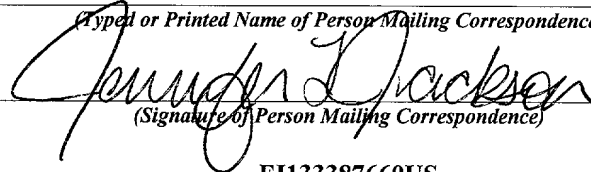
97-106 CIPSerial No.
TO BE ASSIGNEDFiling Date
September 2, 1998Examiner
N/AGroup Art Unit
N/AInvention: **SNAP-ON SCREW-OFF CLOSURE**

I hereby certify that this Patent Application Transmittal Letter, Declaration and Power of Attorney, Patent Application, Five (5) Sheets of Drawing, Verified Statement Claiming Small Entity Status, Coversheet for Assignment, Assignment of Invention and Checks for \$40.00 & \$439.00
(Identify type of correspondence)

is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 in an envelope addressed to: The Assistant Commissioner for Patents, Washington, D.C. 20231 on
September 2, 1998
(Date)

Jennifer L. Jackson

(Typed or Printed Name of Person Mailing Correspondence)



(Signature of Person Mailing Correspondence)

EI133387660US

("Express Mail" Mailing Label Number)

Note: Each paper must have its own certificate of mailing.

Practitioner's Docket No. 97-106

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: LONG, Charles J., Jr.

Serial No.: 08 / 961,440

Group No.: 3727

Filed: October 30, 1997

Examiner: Hylton, R.

For: Snap-On Screw-Off Closure

Assistant Commissioner for Patents
Washington, D.C. 20231

**NOTIFICATION OF FILING OF CONTINUING,
DIVISIONAL OR CONTINUED PROSECUTION APPLICATION**

Notification is hereby being made of the filing of a:

- ☐ continuation
- ☒ continuation-in-part
- ☐ divisional
- ☐ continued prosecution

application for this case

- ☒ concurrently herewith.
- ☐ on _____

Date

CERTIFICATION UNDER 37 CFR 1.8(a) and 1.10

*(When using Express Mail, the Express Mail label number is mandatory;
Express Mail certification is optional.)*

I hereby certify that, on the date shown below, this correspondence is being:

MAILING

- ☐ deposited with the United States Postal Service in an envelope addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231

37 CFR 1.8(a)

- ☐ with sufficient postage as first class mail.

37 CFR 1.10

- ☒ as "Express Mail Post Office to Addressee"

Mailing Label No. → (mandatory) EG831773404US

TRANSMISSION

- ☐ transmitted by facsimile to the Patent and Trademark Office.

Date: 9/2/98

Signature

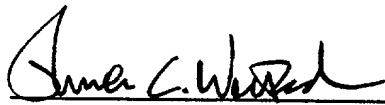
Jennifer L. Jackson

(type or print name of person certifying)

***WARNING:** Each paper or fee filed by Express Mail **must** have the number of the "Express Mail" mailing label placed thereon prior to mailing. 37 C.F.R. 1.10(b).

"Since the filing of correspondence under § 1.10 without the Express Mail mailing label thereon is an oversight that can be avoided by the exercise of reasonable care, requests for waiver of this requirement will **not** be granted on petition." Notice of Oct. 24, 1996, 60 Fed. Reg. 56,439, at 56,442.

(Notification of Filing of Continuing, Divisional or Continued Prosecution Application [4-9] (page 1 of 2))



SIGNATURE OF PRACTITIONER

Reg. No. 24,455

Thomas C. Wettach

(type or print name of practitioner)

Tel. No.: (412) 642-2000

Titus & McConomy LLP, 20th Floor, 4 Gateway Center

P.O. Address

Customer No.:

Pittsburgh, PA 15222

TITLE

SNAP-ON SCREW-OFF CLOSURE

CROSS-REFERENCE

This application is a continuation-in-part (CIP) of U.S. Patent Application Serial No.

5 08/961,440 filed October 30, 1997, the disclosure of which is incorporated herein by reference.

FIELD OF THE INVENTION

The present invention relates to a closure and neck finish for blow-molded containers and in particular to a snap-on closure with a tamper evident locking feature that can be
10 screwed off the container after initial application and then reapplied by screwing the closure onto the container.

RELATED APPLICATIONS

One family of related patent applications assigned to the assignee of the present application include U.S. Patent Application Serial No. 09/067,583 filed April 28, 1998,
15 which is a continuation-in-part of U.S. Patent Application Serial No. 08/948,342 filed October 8, 1997, which is a continuation-in-part of U.S. Patent Application Serial No. 08/927,311 filed September 11, 1997, which is a continuation-in-part of U.S. Patent Application Serial No. 08/749,488 filed on November 15, 1996, which is a continuation-in-part of U.S. Patent Application Serial No. 08/603,148 filed on February 15, 1996. Another
20 family of related patent applications assigned to the assignee of the present application include U.S. Patent Application Serial No. 08/927,743 filed September 11, 1997, which is

a continuation-in-part of U.S. Patent Application Serial No. 08/838,133 filed on April 15, 1997, which is a continuation-in-part of U.S. Patent Application Serial No. 08/687,149 filed on July 24, 1996, which is a continuation-in-part of U.S. Patent Application Serial No. 08/633,225 filed on April 16, 1996.

BACKGROUND OF THE INVENTION

Tamper evident caps for containers, such as blow-molded or injection molded containers are well known, see e.g., U.S. Patent Nos. 4,561,553, 4,625,875, 4,497,765, and 4,534,480. A number of caps are of the snap-on screw-off variety such as U.S. Patent Nos. 5,553,727, 5,190,178, 5,213,224, 5,267,661, 5,285,912, 5,480,045, 5,456,376, and 5,307,946 and 5,560,504. Generally, the prior art caps include a spiral thread or threads which match a spiral thread on the neck of the bottle. In U.S. Patent No. 5,307,946 the cap and bottle neck include a seven lead-in end annular spiral thread configuration (or fastening means) and in U.S. Patent No. 5,553,727 the cap and bottle neck include a ten lead-in end annular spiral thread configuration (or fastening means). The advantage of the multiple lead-in threads is the increased ease of "snap-on" placement of the cap onto the threaded neck using standard bottle capping equipment and without an additional tightening step such as a final twist.

As is apparent from the prior art patents, a great deal of effort has gone into design of cap and bottle neck configurations to provide easy on and off use of the cap by the bottler and ultimately by the end user of the bottled product. However, notwithstanding this effort,

the bottling industry continues to search for a cap and neck finish which achieves these objectives but which also provides a secure seal.

The present invention solves this problem by optionally providing at least one annular sealing bead depending from the outer surface of the closure valve which are compressed
5 against the inner surface of the container neck to form a seal as the closure is snapped onto the container neck. Optionally, sealing engagement between the closure and the mating portions of the exterior wall of the container neck may be further improved by including one or more annular sealing beads on the interior surface of the closure depending annular skirt.

The present invention also solves the problem of protecting the integrity of frangible
10 elements during installation of threaded tamper-evident closures. A plurality of elevated areas extend upwardly from the tamper-evident band in spaced relation to the bottom edge of the closure body. The purpose of these elevated areas is to support the tamper evident band in resisting vertical movement imparted by insertion of the closure on the bottle neck, thereby protecting the frangible elements during assembly. The frangible elements
15 connecting the tamper-evident band to the lower edge of the closure body may be configured to extend from these elevated areas as well as the non-elevated areas of the tamper-evident band. The purpose of attaching frangible elements to the elevated areas of the tamper-evident band is to assist in preventing axial misalignment of the tamper-evident band relative to the annular depending skirt portion of the closure upon subjecting the closure to torquing
20 forces during assembly to the container neck.

At least one and preferably a plurality of circumferentially spaced lugs optionally extend from the exterior wall of the container neck. These lugs facilitate breaking the

frangible elements on the tamper-evident band of the closure by engaging the frangible elements as the closure is twisted off the container neck following initial snap-on application.

Additionally, the tamper indicating closure may include at least one arcuate projection extending around at least a portion of the tamper indicating ring arranged for registration with an annular locking flange on a container neck portion on which the closure is positioned. The closure is provided with at least one member attached to the tamper-indicating ring which cooperates with the arcuate projection to assist in breaking the tamper indicating ring during removal of the closure from the container neck. The arcuate projection is held in place by the locking flange on the container neck as the member is pulled away from the arcuate projection during twist-off removal of the closure body to cause the tamper indicating ring to break at a weakened area.

Accordingly, it is an object of the present invention to improve sealing engagement between the closure and the mating portions of the interior wall of the container neck by including at least one annular sealing bead depending from the outer surface of the closure valve which are compressed against the inner surface of the container neck to form a seal as the closure is snapped onto the container neck.

It is a further object of the present invention to improve sealing engagement between the closure and the mating portions of the exterior wall of the container neck by including one or more annular sealing beads on the interior surface of the closure depending annular skirt.

It is a further object of the present invention to provide a lug configuration for facilitating the breakage of frangible elements on the tamper evident band of the closure.

It is a further object of the present invention to provide a threaded tamper-evident closure having frangible elements attached from and between a plurality of elevated areas extending upwardly from the tamper-evident band, for protecting the integrity of frangible elements during installation of the closure on a bottle neck.

5 It is a further object of the present invention to provide a closure with at least one member attached to the tamper-indicating ring which cooperates with the arcuate projection to assist in breaking the tamper indicating ring during removal of the closure from the container neck.

SUMMARY OF THE INVENTION

10 The present invention provides a closure with a thread configuration adapted for snap-on or screw-on application to a container neck finish. Preferably the closure and neck finish contain eight or nine mating continuous or discontinuous threads for this purpose.

 The present invention preferably provides at least one annular sealing bead depending from the outer surface of the closure valve which are compressed against the inner surface
15 of the container neck to form a seal as the closure is snapped onto the container neck. Optionally, sealing engagement between the closure and the mating portions of the exterior wall of the container neck may be further improved by including one or more annular sealing beads on the interior surface of the closure depending annular skirt.

 The present invention also preferably provides plurality of elevated areas extend
20 upwardly from the tamper-evident band in spaced relation to the bottom edge of the closure body to support the tamper evident band in resisting vertical movement imparted by insertion

of the closure on the bottle neck, thereby protecting the frangible elements during assembly. The frangible elements connecting the tamper-evident band to the lower edge of the closure body may be configured to extend from these elevated areas as well as the non-elevated areas of the tamper-evident band to assist in preventing axial misalignment of the tamper-evident band relative to the annular depending skirt portion of the closure upon subjecting the closure to torquing forces during assembly to the container neck.

Additionally, the tamper indicating closure may include at least one arcuate projection extending around at least a portion of the tamper indicating ring arranged for registration with an annular locking flange on a container neck portion on which the closure is positioned. The closure is optionally provided with at least one member attached to the tamper-indicating ring which cooperates with the arcuate projection to assist in breaking the tamper indicating ring during removal of the closure from the container neck. The arcuate projection is held in place by the container neck as the member is pulled away from the arcuate projection during twist-off removal of the closure body to cause the tamper indicating ring to break at a weakened area.

At least one and preferably a plurality of circumferentially spaced lugs optionally extend from the exterior wall of the container neck to facilitate breaking the frangible elements on the tamper-evident band of the closure by engaging the frangible elements as the closure is twisted off the container neck following initial snap-on application.

Other advantages of the present invention will become apparent by a perusal of the following detailed description of a presently preferred embodiment of the invention taken in connection with the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is an elevation in partial section of a bottle neck finish and closure according to the present invention;

Figure 1A is an enlarged view of the circumferential mating engagement of the closure and container neck shown in Figure 1;

Figures 2 and 2A are enlarged sectional views of the tamper-evident band of the closure of the present invention;

Figure 3 is a sectional view of the closure sealing valve as it is attached to the closure of the present invention;

Figure 4 is an exploded view of the arcuate locking projection of the present invention; and

Figure 5 is a plan view of the closure showing the cooperation of the arcuate locking projection with a member extending from the closure body to facilitate breaking the tamper-evident band.

DETAILED DESCRIPTION OF THE PRESENTLY PREFERRED EMBODIMENT

Referring to Figures 1 and 1A, the neck finish **10** of a container **11** is partially shown. Neck finish **10** is preferably made of plastic and more preferably a high density plastic suitable for blow molding manufacture of the neck finish **10**. Neck finish **10** includes an annular wall **12** having a first end **14** and a second end **16** and defining a cylindrical opening **13** within the neck finish **10**, with first end **14** providing access to opening **13**.

Positioned adjacent to second end **16** is at least one and preferably a plurality of circumferentially spaced lugs **18** extend from the exterior wall of the container neck. Lugs **18** may be preferably positioned around the entire circumference of the annular wall **12** or alternately only a portion thereof. Lugs **18** facilitate breaking the frangible elements on the tamper-evident band **34** of the closure **30** by engaging frangible elements **35** connecting the tamper-evident band **34** to the closure **30** as the closure **30** is twisted off the container neck **10** following initial snap-on application of the closure **30**.

Helically extending between first end **14** and the second end **16** of the annular wall **12** are an appropriate number of threads to permit snap-on or screw-on application, preferably eight or nine threads **24** terminating at points **26** and **27** proximate to the first end **14** and second end **16** of annular wall **12**, respectively. Preferably, threads **24** are helically spaced in a continuous relationship as shown in Figure 1 but threads **24** can alternately be discontinuous and can take on any cross-sectional profile suitable for mating with threads **43** on the closure **30** during snap and screw-on application of the closure **30** to the neck finish **10**.

Closure **30** is preferably made from a low or high density polypropylene suitable for blow molding manufacturing. Cap **30** comprises a closure member **31** designed to cover the cylindrical opening **13** of the container neck finish **10**. In a preferred embodiment of the invention, closure member **31** is substantially circular and an annular wall **32** circumferentially surrounding at least a portion of neck finish **10** depends from closure member **31**.

Annular wall 32 includes a tamper-evident band 34 around the end opposite the closure member 31. Tamper-evident band 34 includes at least one and preferably a plurality of frangible elements 35 extending around at least a portion of the circumference of the tamper-evident band 34. As shown in Figures 2 and 2A, at least one and preferably a plurality of elevated areas 36 extend upwardly from the tamper-evident band 34 in spaced relation to the bottom edge of annular wall 32. The purpose of these elevated areas is to support the tamper evident band 34 in resisting vertical movement imparted by insertion of the closure on the bottle neck, thereby protecting the frangible elements 35 during assembly. As shown in Figure 3, the frangible elements 35a connecting the tamper-evident band 34 to the lower edge of annular wall 32 may be configured to extend from these elevated areas 36 as well as from the non-elevated areas of the tamper-evident band 34. The purpose of attaching frangible elements to the elevated areas 36 of the tamper-evident band 34 is to assist in preventing axial misalignment of the tamper-evident band 34 relative to the annular wall portion 32 of the closure 30 upon subjecting the closure 30 to torquing forces during snap-on assembly to the container neck finish 10.

Optionally, tamper-evident band 34 may be configured with at least one or more arcuate flanged locking projections 37 circumferentially spaced about the inner surface of the tamper evident ring 34 and positioned so that they are engageable under an annular locking flange on a bottle neck (not shown) to lock the closure 30 on the bottle neck. As can be seen in Figure 4, arcuate projections 37 can comprise edges 37a defining grooves 37b formed on radially upwardly extending annular flanges 37c. Flanges 37c can be discontinuous or continuous. Edge 37a and groove 37b provide a "hook" shape for engaging

the annular locking flange on the container neck (not shown) which has a radius substantially the same as groove **37b**. The surface of flange **37c** may lie at an angle with a plane normal to the inner surface of the tamper-evident band **34**, thereby defining a grooved "hook" with a reverse basis allowing flange **37c** to slide over the locking flange on the bottle neck when the closure is placed on the container but which engages and locks the closure to the container when removal of the closure is attempted with the tamper-evident band **34** intact. The aforementioned angle may vary over the surface of flange **37c** such that at least a portion of the flange surface lies substantially parallel to the interior surface of the tamper indicating band **34**. This flanged edge and groove configuration **37a-37c** may be positioned at any elevation the surface of tamper-evident band **34**, including a position adjacent to the bottom edge of tamper-evident band **34** as shown in Figure 4. in Because groove **37b** is undercut, a mold core must be used that frees or permits removal of undercut prior to stripping the closures from the mold. Various techniques are known to those skilled in the art including the use of movable core sleeves which free the undercut section of the mold.

As shown in Figure 5, tamper-evident band **34** is also attached to a member **40** extending from annular wall **32** to facilitate breaking the tamper-evident band **34** when unscrewing the closure **30** to remove it from the neck finish **10** of the container **11**. Preferably member **40** is also attached to the tamper-evident band **34** by a strip **41** of material extending between member **40** and tamper-evident band **34** and located proximate to a weakened area **42** formed in the tamper evident band **34**. The unscrewing of the closure **30** from the container neck finish **10** produces an upward force on the member **40** which is translated through strip **41** to the attached portion **B** of the tamper-evident band **34**. This

upward force acts in concert with a downward force exerted by interference between the container neck finish **10** and the portion **A** of the tamper-evident band **34** containing arcuate flange **37** to cause the weakened area **42** to rupture, thereby breaking the tamper-evident band **34** to allow the closure **30** to be removed from the container **11**. The tamper-evident band **34** will remain with the closure **30** due to the strip **41** attaching the member **40** to the tamper-evident band **34**. Strip **41** can subsequently be completely broken away to allow removal of the tamper-evident band **34** from the closure **30**.

Extending from a location proximate to closure member **31** to a location proximate to tamper-evident band **35** are an appropriate number of threads to permit snap-on or screw-on application, preferably eight or nine helically spaced threads **43** on the inner surface of annular depending wall **32** each having respective lead openings **44** and **46**. Preferably, closure threads **43** are helically spaced in a continuous relationship as shown in Figure 1 but threads **43** can alternately be discontinuous and can take on any cross-sectional profile suitable for mating with threads **24** on the container neck finish **10** during snap and screw-on application of the closure **30** to the neck finish **10**.

As shown in Figure 3, depending from closure member **31** is depending annular valve **48**. Annular valve **48** is spaced apart from annular depending closure wall **32** a distance which is represented by the difference in the radial distance between the outer surface of the annular neck finish wall **12** and the center of the circumferential opening **13** on the one hand and the radial distance between the inner surface of annular wall **12** and the center of the circumferential opening **13** on the other hand. Preferably valve **48** includes a taper proximate to its lower edge which permits initial engagement of the valve **48** to the inner

periphery of the neck finish **10** opening upon application of the closure **30** to the neck finish **10**. Optionally, valve **48** contains at least one and preferably a plurality of annular sealing beads **54** depending from the outer surface of the closure valve which are compressed against the inner surface of the container neck annular wall **12** to form a seal as the closure **30** is snapped onto the container neck **10**. Annular sealing beads **54** also contribute to the sealing force of the closure disk **31** against the container neck finish **10** as beads **54** lock beneath corresponding flanges on the inner surface of the container neck **10** (not shown).

Optionally, sealing engagement between the closure **30** and the mating portions of the exterior of the container neck annular wall **12** may be further improved by including one or more annular sealing beads **55** extending around at least a portion of the interior surface of the closure depending annular skirt **32**. In the preferred embodiment an annular sealing bead **55** is positioned on annular wall **32** proximate of closure element **31** and is located and dimensioned to engage and cooperatively secure closure **30** to an annular ring flange or groove **21** on neck finish **10** when the cap is snapped onto the neck finish **10**.

Cap **30** when used in combination with neck finish **10** of the present invention permits the placement of the cap on the neck finish by snap-on or twist-on application. By preferably utilizing eight or nine threads **24** and **43**, it is not necessary to screw the cap on or off the neck. However, by twisting the cap it is possible to obtain an even more secure closure when used by the ultimate consumer, while at the same time providing a leak proof container at the capping station without the necessity of so twisting.

While presently preferred embodiments of the invention have been shown and described in particularity, the invention may be otherwise embodied within the scope of the appended claims.

WHAT IS CLAIMED IS:

1. A tamper indicating closure comprising:
 - a. a top portion;
 - b. an annular depending skirt extending from said top portion, said depending skirt having an internal thread configuration adapted for engaging an external thread configuration on the neck portion of said container by either snap on application or screw on application of said closure to said container neck;
 - c. an annular valve depending from top portion in spaced relation to said depending skirt; and
 - d. a tamper indicating ring connected to said depending skirt by at least one circumferentially located frangible element.
2. The tamper indicating closure of Claim 1, wherein said tamper indicating ring includes at least one annularly spaced elevated bridge portion extending axially towards said depending skirt, wherein said at least one elevated bridge portion define an area of decreased ring spacing from said depending skirt.
3. The tamper indicating closure of Claim 2, further comprising a plurality of said frangible elements and said elevated bridge portions, wherein said frangible elements are connected to said depending skirt between said elevated bridge portions.

4. The tamper indicating closure of Claim 3, wherein said frangible elements are connected to said depending skirt from and between said elevated bridge portions.

5. The tamper indicating closure of Claim 3 wherein said elevated bridge portions extending from said annular ring are of a known vertical height, and said frangible elements are of a height greater than that of said known height of said elevated bridge portions.

6. The tamper indicating closure of Claim 4 wherein said elevated bridge portions extending from said annular ring are of a known vertical height, and said frangible elements are of a height greater than that of said known height of said elevated bridge portions.

7. The tamper indicating closure of Claim 1, wherein said container neck contains at least one lug configured for engaging said frangible element(s) to disconnect said closure from said tamper evident band upon twist-off removal of said closure from said container neck.

8. The tamper indicating closure of Claim 6, wherein said container neck contains at least one lug configured for engaging said frangible element(s) to disconnect said closure from said tamper evident band upon twist-off removal of said closure from said container neck.

9. The tamper indicating closure of Claim 1, wherein said annular valve includes at least one annular sealing bead extending around at least a portion of the circumference of said

valve and being configured for engagement with the interior surface of said container neck finish.

10. The tamper indicating closure of Claim 8, wherein said annular valve includes at least one annular sealing bead extending around at least a portion of the circumference of said valve and being configured for engagement with the interior surface of said container neck finish.

11. The tamper indicating closure of Claim 1, wherein said annular depending skirt includes at least one annular sealing bead extending around at least a portion of the circumference of said skirt and being configured for engagement with the exterior surface of said container neck finish.

12. The tamper indicating closure of Claim 10, wherein said annular depending skirt includes at least one annular sealing bead extending around at least a portion of the circumference of said skirt and being configured for engagement with the exterior surface of said container neck finish.

13. The tamper indicating closure of Claim 11, wherein at least one said one annular sealing bead engages a sealing bead on the exterior of said container neck finish.

14. The tamper indicating closure of Claim 11, wherein at least one said one annular sealing bead engages a sealing groove on the exterior of said container neck finish.

15. The tamper indicating closure of Claim 12, wherein at least one said one annular sealing bead engages a sealing bead on the exterior of said container neck finish.

16. The tamper indicating closure of Claim 12, wherein at least one said one annular sealing bead engages a sealing groove on the exterior of said container neck finish.

17. The tamper indicating closure of Claim 1, wherein said thread configurations contain eight or nine circumferentially spaced individual thread leads.

18. The tamper indicating closure of Claim 12, wherein said thread configurations contain eight or nine circumferentially spaced individual thread leads.

19. The tamper indicating closure of Claim 17, wherein said thread leads are segmented.

20. The tamper indicating closure of Claim 18, wherein said thread leads are segmented.

21. The tamper indicating closure of Claim 1, wherein said tamper indicating ring includes at least one arcuate projection extending around at least a portion of said tamper indicating ring arranged for registration with a container neck portion on which said closure is positioned.

22. The tamper indicating closure of Claim 21, wherein at least one said arcuate projection comprises a locking member extending radially inward from said tamper indicating ring at an angle to a plane normal with said tamper indicating ring.

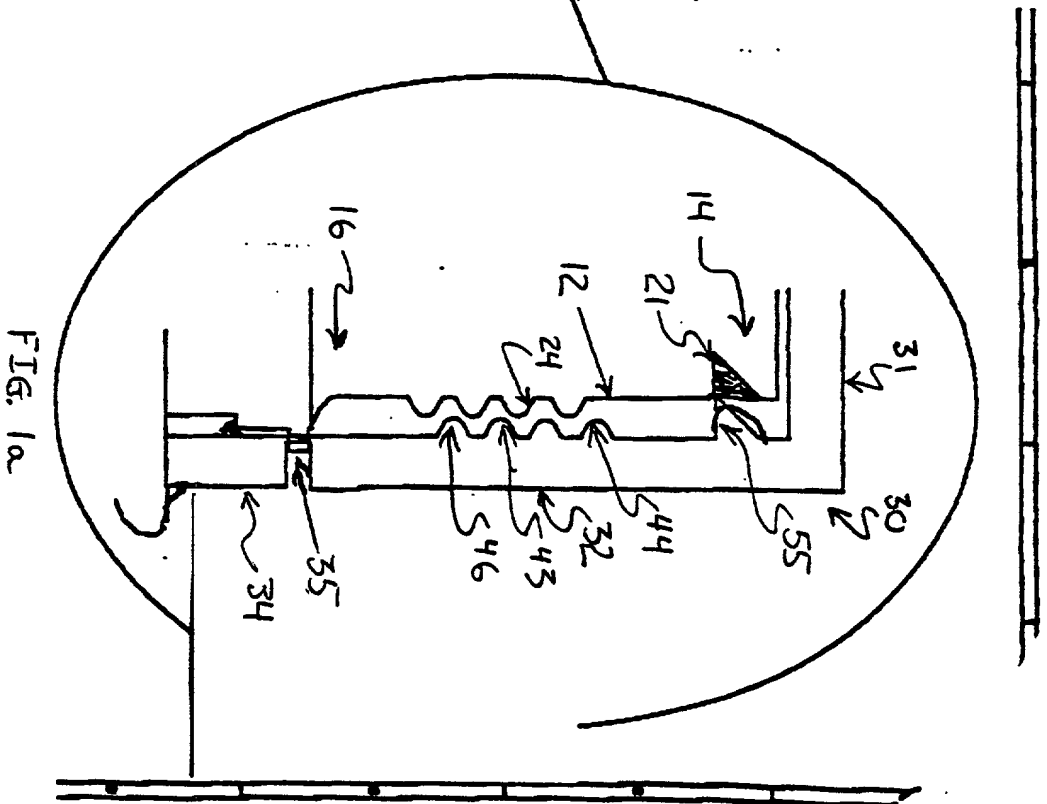
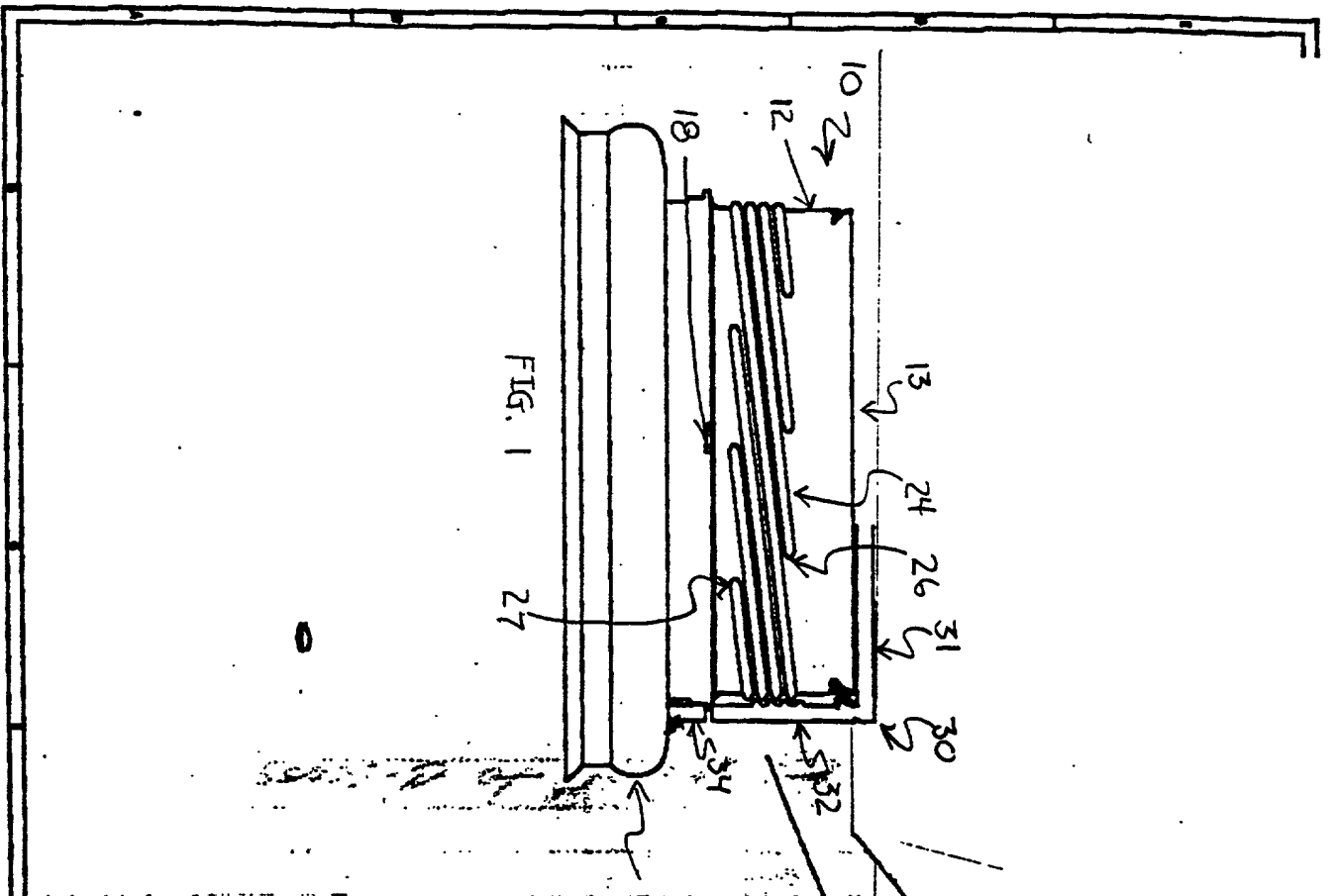
23. The tamper indicating closure of Claim 21, wherein said closure includes at least one member attached to said tamper-indicating ring which cooperates with at least one said arcuate projection to assist in breaking said tamper indicating ring during removal of said closure from said container neck.

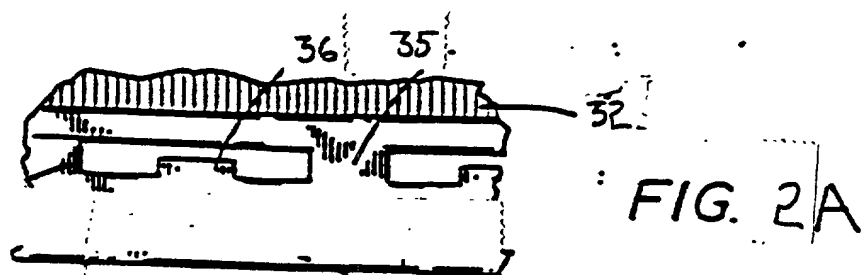
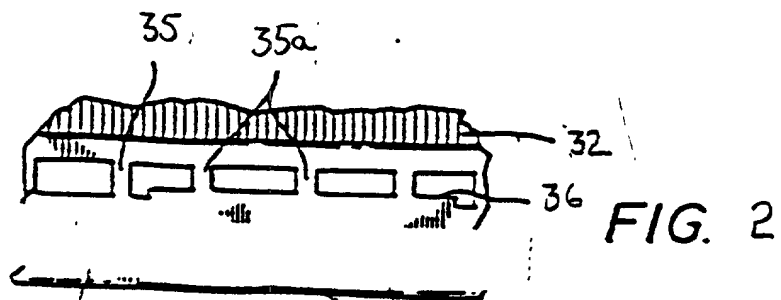
24. The tamper indicating closure of Claim 23, wherein at least one said arcuate projection is held in place by an annular locking flange on said container neck as said member is pulled away from said arcuate projection by twist-off removal of said annular depending skirt to cause said tamper indicating ring to break at a weakened area.

ABSTRACT OF THE DISCLOSURE

The present invention provides a closure with a thread configuration adapted for snap-on or screw-on application to a container neck finish. Preferably the closure and neck finish contain eight or nine mating continuous or discontinuous threads for this purpose. The present invention preferably provides at least one annular sealing bead depending from the outer surface of the closure valve which are compressed against the inner surface of the container neck to form a seal as the closure is snapped onto the container neck. Optionally, sealing engagement between the closure and the mating portions of the exterior wall of the container neck may be further improved by including one or more annular sealing beads on the interior surface of the closure depending annular skirt. The present invention also preferably provides plurality of elevated areas extend upwardly from the tamper-evident band in spaced relation to the bottom edge of the closure body to support the tamper evident band in resisting vertical movement imparted by insertion of the closure on the bottle neck, thereby protecting the frangible elements during assembly. The frangible elements connecting the tamper-evident band to the lower edge of the closure body may be configured to extend from these elevated areas as well as the non-elevated areas of the tamper-evident band to assist in preventing axial misalignment of the tamper-evident band relative to the annular depending skirt portion of the closure upon subjecting the closure to torquing forces during assembly to the container neck. At least one and preferably a plurality of circumferentially spaced lugs optionally extend from the exterior wall of the container neck to facilitate breaking the frangible elements on the tamper-evident band of the closure by engaging the frangible elements as the closure is twisted off the container neck following initial snap-on application. The closure is optionally provided with at least one

member attached to the tamper-indicating ring which cooperates with the arcuate projection to assist in breaking said tamper indicating ring during removal of the closure from the container neck.





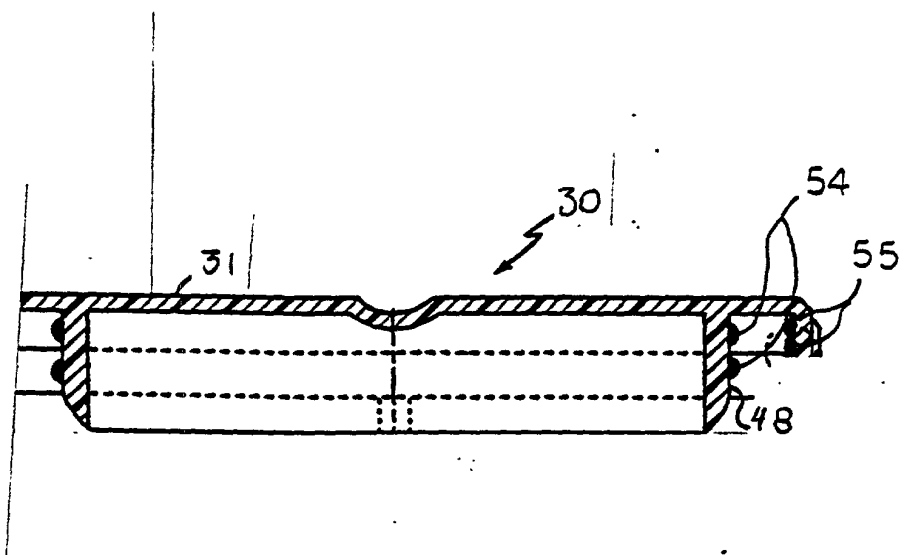


FIG. 3

36

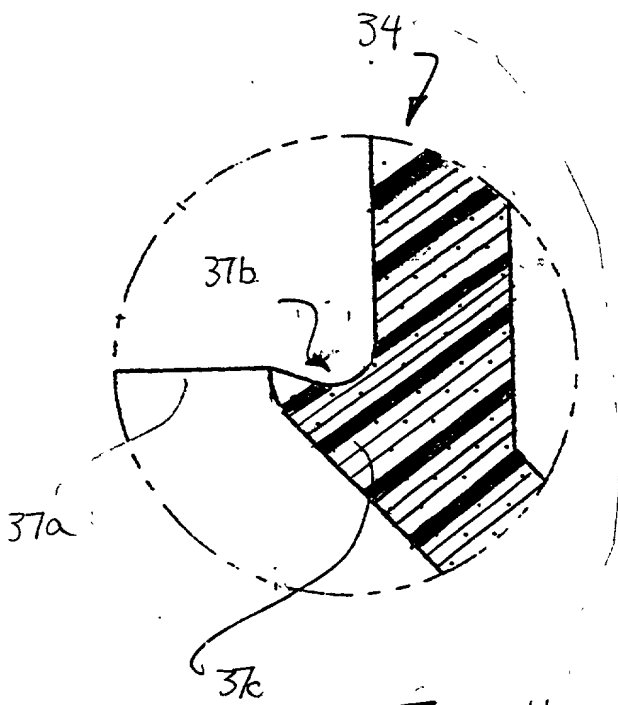
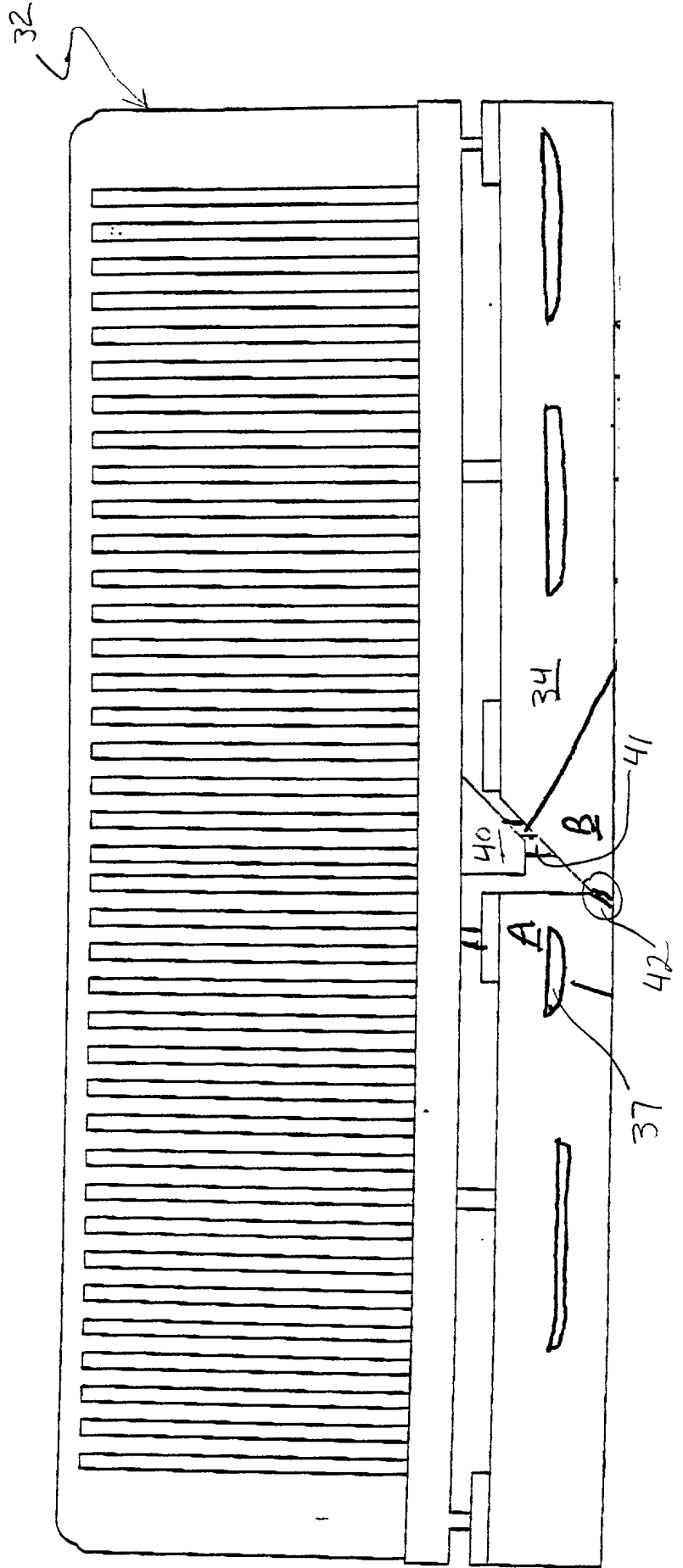


FIG 4

FIG. 5



Docket No.
97-106 CIP

Declaration and Power of Attorney For Patent Application

English Language Declaration

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

SNAP-ON SCREW-OFF CLOSURE

the specification of which

(check one)

☒ is attached hereto.

☐ was filed on _____ as United States Application No. or PCT International Application Number _____ and was amended on _____ (if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d) or Section 365(b) of any foreign application(s) for patent or inventor's certificate, or Section 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)			Priority Not Claimed
_____	_____	_____	<input type="checkbox"/>
(Number)	(Country)	(Day/Month/Year Filed)	
_____	_____	_____	<input type="checkbox"/>
(Number)	(Country)	(Day/Month/Year Filed)	
_____	_____	_____	<input type="checkbox"/>
(Number)	(Country)	(Day/Month/Year Filed)	

I hereby claim the benefit under 35 U.S.C. Section 119(e) of any United States provisional application(s) listed below:

(Application Serial No.)

(Filing Date)

(Application Serial No.)

(Filing Date)

(Application Serial No.)

(Filing Date)

I hereby claim the benefit under 35 U. S. C. Section 120 of any United States application(s), or Section 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. Section 112, I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, C. F. R., Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application:

08/961,440

October 30, 1997

PENDING

(Application Serial No.)

(Filing Date)

(Status)
(patented, pending, abandoned)

(Application Serial No.)

(Filing Date)

(Status)
(patented, pending, abandoned)

(Application Serial No.)

(Filing Date)

(Status)
(patented, pending, abandoned)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. *(list name and registration number)*

Thomas C. Wettach

Registration No. 24,455

Debra M. Parrish

Registration No. 38,032

David G. Oberdick

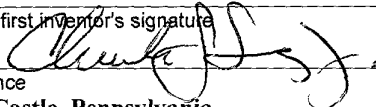
Registration No. 39,527

Gerald J. Iwanejko, Jr.

Registration No. 38,501

Send Correspondence to: Thomas C. Wettach, Esquire
 Titus & McConomy LLP
 Twentieth Floor, Four Gateway Center
 Pittsburgh, PA 15222

Direct Telephone Calls to: *(name and telephone number)*
 Thomas C. Wettach, Esquire (412) 642-2000

Full name of sole or first inventor	LONG, Charles J., Jr.	
Sole or first inventor's signature		Date 8/25/9
Residence	New Castle, Pennsylvania	
Citizenship	United States	
Post Office Address	RD #4, P.O. Box 62a, Harlansburg Road, New Castle, PA 16101	

Full name of second inventor, if any		
Second inventor's signature		Date
Residence		
Citizenship		
Post Office Address		

**VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY
STATUS (37 CFR 1.9(f) AND 1.27 (c)) - SMALL BUSINESS CONCERN**

Docket No.
97-106

Serial No.
to be assigned

Filing Date
September 2, 1998

Patent No.
N/A

Issue Date
N/A

Applicant/ **LONG, Charles J., Jr.**
Patentee:

Invention: **SNAP-ON SCREW-OFF CLOSURE**

I hereby declare that I am:

- ☒ the owner of the small business concern identified below:
☐ an official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF CONCERN: **International Plastics and Equipment Corporation**

ADDRESS OF CONCERN: **Northgate Industrial Park, New Castle, PA 16105**

I hereby declare that the above-identified small business concern qualifies as a small business concern as defined in 37 CFR 121.3-18, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees under Section 41(a) and (b) of Title 35, United States Code, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the above identified invention described in:

- ☒ the specification filed herewith with title as listed above.
☐ the application identified above.
☐ the patent identified above.

If the rights held by the above-identified small business concern are not exclusive, each individual, concern or organization having rights to the invention is listed on the next page and no rights to the invention are held by any person, other than the inventor, who could not qualify as an independent inventor under 37 CFR 1.9(c) or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

- ☒ no such person, concern or organization exists.
☐ each such person, concern or organization is listed below.

FULL NAME _____
 ADDRESS _____

☐ Individual ☐ Small Business Concern ☐ Nonprofit Organization

FULL NAME _____
 ADDRESS _____

☐ Individual ☐ Small Business Concern ☐ Nonprofit Organization

FULL NAME _____
 ADDRESS _____

☐ Individual ☐ Small Business Concern ☐ Nonprofit Organization

FULL NAME _____
 ADDRESS _____

☐ Individual ☐ Small Business Concern ☐ Nonprofit Organization

Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27)

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

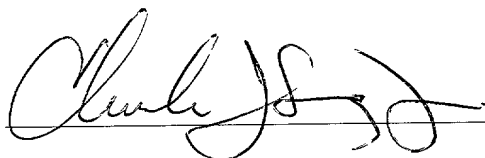
NAME OF PERSON SIGNING: Charles J. Long, Jr.

TITLE OF PERSON SIGNING _____

OTHER THAN OWNER: Secretary and Treasurer

ADDRESS OF PERSON SIGNING: RD #4, P.O. Box 62a, Harlansburg Road, New Castle, PA 16101

SIGNATURE: _____



DATE: _____

8/25/98